

REMARKS

New claims 29-47 are pending in the present application.

Claims 1-28 have been cancelled. New claims 29-47 have been added. Claims 29, 31, 33, and 36 are replacements for claims 1, 2, 4, and 6, respectively, and are now in better U.S. form and include additional features. New features added to one or more of claims 29, 31, 33, and 36 include, but are not limited to, the following: the proportion (HI) of resulting vinyl-cis-polybutadiene being insoluble in boiling n-hexane; the adjustment of the water content to 0.1 to 1.0 mole per mole of organoaluminum compound (other features regarding water adjustment are no longer present); the cis-1,4-polymerization catalyst comprising an organoaluminum compound and a soluble cobalt catalyst or nickel catalyst or lanthanoid catalyst; and the features of original claims 8, 11, 12, and 13.

Claim 35 replaces claim 14. Claims 38, 41, and 43-47 replace claims 16-22 and include the features of claim 24. Claims 39 and 42 replace claims 26 and 27. Claim 40 replaces claim 28.

New claims 30, 32, 34, and 37 are added and recite the solvent being cyclohexane and the amount of organoaluminum compound and carbon disulfide utilized.

The specification has been amended to correct obvious errors. The term "triethylaluminum chloride" has been replaced with "triethylaluminum" since "triethylaluminum chloride" does not exist as recognized by one of ordinary skill in the art. Additionally, the term "styrene-indene-styrene" has been replaced by "styrene-isoprene-styrene" in various places of the specification and included in claims 31 and 35. Support for the amendments to the specification can be found in, for example, the substitute specification in paragraphs [0049], [0056], and [0061]. Support for the new claims can be found in, for example, the claims as filed and the substitute specification in paragraphs [0023], [0045], [0047], and [0056]. Accordingly, no new matter has been added and Applicants respectfully request that the Amendment be entered.

Claims 1-28 are rejected under 35 U.S.C. § 102(b) as anticipated by JP 56-109205 (Takeuchi et al.) ("Takeuchi"). The Examiner alleges that Takeuchi discloses a method for producing a rubber composition containing a 2-40% content of 1,2-polybutadiene, cis-1,4-polyisoprene, toluene, water, cobalt compound (cobalt octanoate), trialkyl aluminum (triethyl aluminum), and carbon disulfide (claim 1, Example 1). The Examiner contends that this rubber can be blended with natural rubber or isoprene rubber for tire applications (Table 3, Working Example 3, second paragraph on page 10 in translation of Takeuchi, first paragraph on page 3 in translation of Takeuchi). It appears that the Examiner's position is that the cited disclosure of Takeuchi is sufficient to anticipate claim 1. Additionally, the Examiner alleges that the features of claims 2-6 are found in Example 1 and pages 4-9 of the translation of Takeuchi, where a polymerization process and polybutadiene containing 98% of a cis-1,4-bond and having a Mooney viscosity of 65 are disclosed.

Claims 1-28 have been replaced with new claims 29-47, and the discussion below will focus on the new claims. The rejection is respectfully but strenuously traversed insofar as it may be applied to the new claims.

Claims 3 and 5 were cancelled and not replaced. Claims 1, 2, 4, and 6 have been replaced by claims 29, 31, 33, and 36, respectively. Claim 29 recites a process for producing a vinyl-cis-polybutadiene rubber, comprising mixing components (A) and (B), wherein component (A) is made by adding a cis-1,4-polymerization catalyst to a mixture containing 1,3-butadiene and a hydrocarbon-based organic solvent to effect cis-1,4-polymerization of the 1,3-butadiene. As is clear from the "Scope of Claims" section of Takeuchi and from the first paragraph of page 10 of the translation of Takeuchi, the invention of Takeuchi is directed to the syndiotactic 1,2-polymerization of 1,3-butadiene in a hydrocarbon or hydrocarbon halide solvent of polyisoprene with a cis-1,4 bond content of at least 90% and/or natural rubber. Applicants have been unable to find in Takeuchi a disclosure of the use of a cis-1,4-polymerization catalyst to effect a cis-1,4-polymerization of 1,3-butadiene. Applicants emphasize that the reference to cis-1,4 bond content in Takeuchi is that of polyisoprene and not of polybutadiene. Accordingly, claim 29 is patentable over Takeuchi at least for this reason.

Additionally, claim 29 recites that the mixture of 1,3-butadiene that is to be polymerized with the cis-1,4-polymerization catalyst has a water content adjusted to a range of 0.1 to 1.0 moles of water per mole of the organoaluminum compound. No such disclosure can be found in Takeuchi, and therefore claim 29 is patentable for this reason as well.

Also, claim 29 recites that the proportion (HI) of a vinyl-cis-polybutadiene insoluble in boiling n-hexane is 10 to 60% by weight. Takeuchi fails to disclose using such a vinyl-cis-polybutadiene as part of the process of Takeuchi. Although the Examiner seems to take the position that such feature is inherent, no explanation has been provided by the Examiner to support such assertion and, therefore, *prima facie* anticipation has not been demonstrated. Thus, claim 29 is patentable over Takeuchi for this reason as well.

Furthermore, claim 29 recites mixing component (A) with component (B), where component (B) is the result of subjecting 1,3-butadiene to a cis-1,4-polymerization catalyst. Takeuchi, fails to disclose a step of mixing, as a component of a composition, a polymer comprising the result of 1,3-butadiene subjected to a cis-1,4-polymerization catalyst. Accordingly, claim 29 is patentable for this reason as well. Thus, at least for the aforementioned reasons, claim 29 is patentable over Takeuchi, and reconsideration and withdrawal of the rejections are respectfully requested.

Similar to claim 29, claim 31 recites: a component (A) made by adding a cis-1,4-polymerization catalyst to a mixture containing 1,3-butadiene and a hydrocarbon-based organic solvent to effect cis-1,4-polymerization of the 1,3-butadiene; the mixture of 1,3-butadiene that is to be polymerized with the cis-1,4-polymerization catalyst has a water content adjusted to a range of 0.1 to 1.0 moles of water per mole of the organoaluminum compound; and the proportion (HI) of a vinyl-cis-polybutadiene insoluble in boiling n-hexane is 10 to 60% by weight. These features are not disclosed in Takeuchi, as explained above regarding claim 29, and claim 31 is therefore patentable over Takeuchi.

Claim 33 recites component (A) being made by dissolving cis-polybutadiene in a mixture of 1,3-butadiene and a hydrocarbon-based organic solvent. Applicants have been unable to find such disclosure in Takeuchi. In particular, Applicants have been unable to find the disclosure of cis-polybutadiene in Takeuchi. Applicants note that cis-polybutadiene and cis-polyisoprene are not the same. Thus, claim 33 is patentable over Takeuchi at least for this reason.

Also, like claim 29, claim 33 recites that the proportion (HI) of a vinyl-cis-polybutadiene insoluble in boiling n-hexane is 10 to 60% by weight and that component (B) is mixed with component (A) and component (B) is the result of subjecting 1,3-butadiene to a cis-1,4-polymerization catalyst. These features are not disclosed in Takeuchi, as explained above regarding claim 29. Thus, claim 33 is patentable over Takeuchi for these reasons as well.

Claim 36 recites component (A) being made by dissolving cis-polybutadiene in a mixture of 1,3-butadiene and a hydrocarbon-based organic solvent and also recites that the proportion (HI) of a vinyl-cis-polybutadiene insoluble in boiling n-hexane is 10 to 60% by weight. These features are not disclosed in Takeuchi, as explained above regarding claim 33. Thus, claim 35 is patentable at least for these reasons.

Claims 7 and 23 were cancelled without prejudice, and not replaced with any other claims, thus making their rejection moot.

Regarding claims 8-9 and 24-25, the Examiner alleges that they recite properties which are inherent in Takeuchi. Claims 9 and 25 have been cancelled without being replaced with corresponding claims, thus making their rejection moot. The features of claims 8 and 24 have been added to claims 29, 31, 33, and 36, which are patentable as explained above.

Regarding claims 10-12, the Examiner alleges that the features of claims 10-12 are found in the claims of Takeuchi and cites to the disclosure of cobalt. The features of claims 10-12 have been added to claims 31, 33, and 36, which are patentable as explained above.

Regarding claims 13-14, the Examiner alleges that the features of those claims are found in Takeuchi at Example 1 and the second and third paragraphs on page 5 of the translation, where it is allegedly disclosed the use of a hydrocarbon-based solvent. Claim 13 was cancelled and not replaced with a corresponding claim, making its rejection moot. Claim 14 was replaced with claim 35, which depends from claim 33, and is therefore patentable at least for the reason that it depends from a patentable base claim.

Additionally, claim 35 recites the addition of at least one member selected from the group consisting of previously polymerized polyisoprene, liquid polyisoprene, crystalline polybutadiene having a melting point of not higher than 150 °C, liquid polybutadiene, a styrene-isoprene-styrene compound, and derivatives thereof in the mixture containing 1,3-butadiene and a hydrocarbon-based solvent as the major components prior to initiation of the 1,2-polymerization in the step (A)(2). Claim 35 recites that the addition of the “at least one member selected from the group consisting of previously polymerized polyisoprene. . .” is to the solution that also includes the cis-polybutadiene, and it is after this that the 1,2-polybutadiene is polymerized. Furthermore, after the 1,2-polymerization, there is mixing with yet another 1,4-cis-polybutadiene. Applicants have not found any such disclosure in Takeuchi. Accordingly, claim 35 is patentable for this reason as well.

Regarding claim 15, it has been cancelled, thus making its rejection moot.

Regarding claims 16-22, the Examiner alleges that the features of those claims can be found in Takeuchi in the abstract, and on the first paragraph of page 3 of the translation, where Takeuchi discloses tire applications, improved properties to tire cords, and high hardness. Claims 16-22 have been replaced with claims 38, 41, and 43-47 .

Claims 38, 41, and 43-47 recite a component (A) made by adding a cis-1,4-polymerization catalyst to a mixture containing 1,3-butadiene and a hydrocarbon-based organic solvent to effect cis-1,4-polymerization of the 1,3-butadiene. Such feature is distinguishable over Takeuchi, as explained above regarding claim 29, since Takeuchi does not disclose the use

of a cis-1,4-polymerization catalyst to effect a cis-1,4-polymerization of 1,3-butadiene. Thus, claims 38, 41, and 43-47 are patentable at least for this reason.

Furthermore, in the present invention, the objective and result are to obtain low exothermic properties and low fuel consumption. The Examiner has not demonstrated that those objectives and results are obtained in Takeuchi, further supporting the patentability of claims 39, 41, and 43-47 .

Regarding claims 26 and 27, the Examiner alleges that the features recited in these claims are disclosed in claim 1 of Takeuchi, where polyisoprene is disclosed. Claims 26 and 27 have been replaced with claims 39 and 42, which depend from claims 38 and 41, respectively, and are patentable at least for the reason that they depend from a patentable base claim.

Regarding claim 28, the Examiner alleges that the features of such claim are disclosed in Example 1 of Takeuchi, where carbon black is disclosed. Claim 28 has been replaced with claim 40, which depends from claim 38, and is therefore patentable at least for the reason that it depends from a patentable base claim.

Claims 30, 32, 34, 37, depend from claims 29, 31, 33, and 36, respectively, and are therefore patentable at least for the reason that they depend from a patentable base claim.

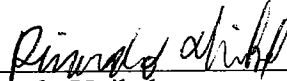
Accordingly, in view of the above, all of the claims are patentable over Takeuchi and reconsideration and withdrawal of the rejections are respectfully requested.

CONCLUSION

In view of the foregoing Amendment and Remarks, Applicants respectfully submit that the claims are in proper form and distinguish over the cited art. Therefore, the present application is in condition for allowance. Reconsideration and an early Notice of Allowance are respectfully requested.

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Respectfully submitted,

By 
Ricardo Unikel

Registration No.: 52,309
PANITCH SCHWARZE BELISARIO & NADEL LLP
One Commerce Square
2005 Market Street, Suite 2200
Philadelphia, Pennsylvania 19103
(215) 965-1358
(215) 965-1331 (Fax)
runikel@panitchlaw.com (E-Mail)

WWS/RUS/acw